

עבודה 5 – יהב יהושוע בריח 326295417, איתי יהודה בנדרסקי 326621927

רשת עם שכבת LSTM אחת וכיוון אימון רגיל:

סעיף 4 - אימון המודל -

```
Regular train with (1) LSTM layers
100%|██████████| 186/186 [00:13<00:00, 13.29it/s]
9.167048
100%|██████████| 186/186 [00:10<00:00, 18.06it/s]
9.11335
100%|██████████| 186/186 [00:10<00:00, 18.02it/s]
9.093447
100%|██████████| 186/186 [00:10<00:00, 17.82it/s]
9.083217
100%|██████████| 186/186 [00:10<00:00, 18.06it/s]
9.07701
100%|██████████| 186/186 [00:09<00:00, 18.81it/s]
9.072839
100%|██████████| 186/186 [00:10<00:00, 18.10it/s]
9.0698395
100%|██████████| 186/186 [00:10<00:00, 18.24it/s]
9.067573
100%|██████████| 186/186 [00:10<00:00, 18.22it/s]
9.0658045
100%|██████████| 186/186 [00:10<00:00, 18.04it/s]
9.0643835
100%|██████████| 186/186 [00:10<00:00, 17.93it/s]
9.063225
100%|██████████| 186/186 [00:09<00:00, 18.81it/s]
9.062265
100%|██████████| 186/186 [00:10<00:00, 17.11it/s]
9.061448
100%|██████████| 186/186 [00:10<00:00, 18.03it/s]
9.060729
100%|██████████| 186/186 [00:10<00:00, 18.08it/s]
9.060103
100%|██████████| 186/186 [00:10<00:00, 18.00it/s]
9.059538
100%|██████████| 186/186 [00:10<00:00, 18.01it/s]
9.059032
100%|██████████| 186/186 [00:10<00:00, 18.32it/s]
9.058581
100%|██████████| 186/186 [00:10<00:00, 18.24it/s]
9.058174
100%|██████████| 186/186 [00:10<00:00, 17.90it/s]
9.057801
```

סעיפים 2,8 - תוצאות ה perplexity -

```
Perplexity of Regular LSTM (1) on train data: 9030.384354111118
Perplexity of Regular LSTM (1) on validation data: 9047.710088073061
Perplexity of Regular LSTM (1) on test data: 9029.635745007196
```

סעיפים 6,9 -

```
### TEMP 0.1
WARNING:tensorflow:5 out of the last 11 calls to <functio
1/1 ██████████ 0s 215ms/step
1/1 ██████████ 0s 34ms/step
<ipython-input-32-6f16fd6f58d8>:28: DeprecationWarning: C
tokens[i] = next_token
1/1 ██████████ 0s 34ms/step
1/1 ██████████ 0s 32ms/step
1/1 ██████████ 0s 32ms/step
I love <UNK> <UNK> <UNK> <UNK> <UNK>
1/1 ██████████ 0s 207ms/step
Probability of this sentence: 1.3460421302289797e-09

### TEMP 1
1/1 ██████████ 0s 39ms/step
1/1 ██████████ 0s 42ms/step
1/1 ██████████ 0s 33ms/step
1/1 ██████████ 0s 35ms/step
1/1 ██████████ 0s 32ms/step
I love Jason bananas uniquely Moore positive
1/1 ██████████ 0s 34ms/step
Probability of this sentence: 1.9977483266594725e-54
```

```
### TEMP 10
1/1 _____ 0s 32ms/step
1/1 _____ 0s 32ms/step
1/1 _____ 0s 32ms/step
1/1 _____ 0s 33ms/step
1/1 _____ 0s 33ms/step
I love this argument modern coalition via
1/1 _____ 0s 52ms/step
Probability of this sentence: 1.8996037019884248e-54

Probability of "I love cupcakes": 0
```

סעיף 7 -

Enter word:

Predict Next Word

Predicted word for "love": -LRB-

1/1 _____ 0s 30ms/step

-LRB-

רשת עם שתי שכבת LSTM וכיוון אימון רגיל:

סעיף 4 - אימון המודל -

```
Regular train with (2) LSTM layers
100%|██████████| 186/186 [00:16<00:00, 11.16it/s] 9.161519
100%|██████████| 186/186 [00:11<00:00, 16.49it/s] 9.136883
100%|██████████| 186/186 [00:11<00:00, 16.52it/s] 9.128648
100%|██████████| 186/186 [00:11<00:00, 16.43it/s] 9.124527
100%|██████████| 186/186 [00:11<00:00, 15.97it/s] 9.122051
100%|██████████| 186/186 [00:11<00:00, 16.62it/s] 9.1204
100%|██████████| 186/186 [00:11<00:00, 16.34it/s] 9.11922
100%|██████████| 186/186 [00:11<00:00, 16.74it/s] 9.118334
100%|██████████| 186/186 [00:10<00:00, 17.00it/s] 9.117645
100%|██████████| 186/186 [00:11<00:00, 16.46it/s] 9.117092
100%|██████████| 186/186 [00:11<00:00, 16.42it/s] 9.116646
100%|██████████| 186/186 [00:11<00:00, 16.51it/s] 9.116275
100%|██████████| 186/186 [00:11<00:00, 16.57it/s] 9.115961
100%|██████████| 186/186 [00:11<00:00, 16.64it/s] 9.115692
100%|██████████| 186/186 [00:11<00:00, 16.41it/s] 9.1154585
100%|██████████| 186/186 [00:11<00:00, 16.51it/s] 9.115254
100%|██████████| 186/186 [00:11<00:00, 16.41it/s] 9.115074
100%|██████████| 186/186 [00:11<00:00, 16.52it/s] 9.114914
100%|██████████| 186/186 [00:11<00:00, 16.30it/s] 9.114771
100%|██████████| 186/186 [00:11<00:00, 15.88it/s] 9.114637
```

סעיפים 2,8 - תוצאות ה perplexity -

```
Perplexity of Regular LSTM (2) on train data: 9030.428480562035
Perplexity of Regular LSTM (2) on validation data: 9047.758108061264
Perplexity of Regular LSTM (2) on test data: 9029.6766489254
```

סעיפים 6,9 -

```
### TEMP 0.1
1/1 ██████████ 0s 293ms/step
1/1 ██████████ 0s 36ms/step
1/1 ██████████ 0s 34ms/step
1/1 ██████████ 0s 37ms/step
1/1 ██████████ 0s 33ms/step
I love <UNK> <UNK> centres <UNK> <UNK>
1/1 ██████████ 0s 278ms/step
Probability of this sentence: 8.553202977690913e-20
```

```
### TEMP 1
1/1 ██████████ 0s 38ms/step
1/1 ██████████ 0s 34ms/step
1/1 ██████████ 0s 35ms/step
1/1 ██████████ 0s 33ms/step
1/1 ██████████ 0s 34ms/step
I love worldwide literally includes cruise Fish
1/1 ██████████ 0s 34ms/step
Probability of this sentence: 9.27485223265458e-56
```

```
### TEMP 10
1/1 ██████████ 0s 34ms/step
1/1 ██████████ 0s 39ms/step
1/1 ██████████ 0s 50ms/step
1/1 ██████████ 0s 63ms/step
1/1 ██████████ 0s 65ms/step
I love northwestern Dance Authority initially Birds
1/1 ██████████ 0s 52ms/step
Probability of this sentence: 9.325960358982769e-56
```

```
Probability of "I love cupcakes": 0
```

סעיף 7 -

Enter word: love

Predict Next Word

Predicted word for "love": June

1/1 ————— 0s 29ms/step

June

רשת עם שכבת LSTM אחת וכיוון אימון הפוך:

סעיף 4 - אימון המודל -

```
Reverse train with (1) LSTM layers
100%|██████████| 186/186 [00:14<00:00, 12.58it/s] 9.168464
100%|██████████| 186/186 [00:10<00:00, 18.58it/s] 9.140318
100%|██████████| 186/186 [00:10<00:00, 18.16it/s] 9.130934
100%|██████████| 186/186 [00:10<00:00, 17.93it/s] 9.12624
100%|██████████| 186/186 [00:10<00:00, 17.98it/s] 9.123422
100%|██████████| 186/186 [00:10<00:00, 18.00it/s] 9.12154
100%|██████████| 186/186 [00:10<00:00, 18.02it/s] 9.120196
100%|██████████| 186/186 [00:10<00:00, 18.46it/s] 9.119188
100%|██████████| 186/186 [00:10<00:00, 18.56it/s] 9.118404
100%|██████████| 186/186 [00:10<00:00, 18.10it/s] 9.117776
100%|██████████| 186/186 [00:10<00:00, 17.97it/s] 9.117268
100%|██████████| 186/186 [00:10<00:00, 17.17it/s] 9.116845
100%|██████████| 186/186 [00:10<00:00, 17.92it/s] 9.116487
100%|██████████| 186/186 [00:10<00:00, 18.03it/s] 9.11618
100%|██████████| 186/186 [00:09<00:00, 18.80it/s] 9.115914
100%|██████████| 186/186 [00:10<00:00, 17.96it/s] 9.115682
100%|██████████| 186/186 [00:10<00:00, 17.88it/s] 9.115477
100%|██████████| 186/186 [00:10<00:00, 17.90it/s] 9.1152935
100%|██████████| 186/186 [00:10<00:00, 17.82it/s] 9.11513
100%|██████████| 186/186 [00:10<00:00, 17.74it/s] 9.11498
```

סעיפים 2,8 - תוצאות ה perplexity -

```
Perplexity of Reverse LSTM (1) on train data: 9030.464815114843
Perplexity of Reverse LSTM (1) on validation data: 9047.792997743809
Perplexity of Reverse LSTM (1) on test data: 9029.712170899431
```

סעיפים 6,9 -

```
### TEMP 0.1
1/1 ██████████ 0s 225ms/step
1/1 ██████████ 0s 37ms/step
1/1 ██████████ 0s 41ms/step
1/1 ██████████ 0s 40ms/step
1/1 ██████████ 0s 39ms/step
I love effort <UNK> following Antilles <UNK>
1/1 ██████████ 0s 250ms/step
Probability of this sentence: 4.8394844635390655e-42
```

```
### TEMP 1
1/1 ██████████ 0s 38ms/step
1/1 ██████████ 0s 36ms/step
1/1 ██████████ 0s 37ms/step
1/1 ██████████ 0s 36ms/step
1/1 ██████████ 0s 40ms/step
I love appeared 53 regiments -RCB- celebrating
1/1 ██████████ 0s 36ms/step
Probability of this sentence: 6.15591106074141e-51
```

```
### TEMP 10
1/1 ██████████ 0s 42ms/step
1/1 ██████████ 0s 39ms/step
1/1 ██████████ 0s 40ms/step
1/1 ██████████ 0s 40ms/step
1/1 ██████████ 0s 38ms/step
I love published RC4 worker breeding 1834
1/1 ██████████ 0s 39ms/step
Probability of this sentence: 3.426845784806609e-50
```

```
Probability of "I love cupcakes": 0
```

Enter word: love

Predict Next Word

Predicted word for "love": Lahore

1/1  0s 132ms/step

Lahore

רשת עם שתי שכבת LSTM וכיוון אימון הפוך:

סעיף 4 - אימון המודל -

```
Reverse train with (2) LSTM layers
100%|██████████| 186/186 [00:17<00:00, 10.51it/s] 9.164911
100%|██████████| 186/186 [00:11<00:00, 16.14it/s] 9.138536
100%|██████████| 186/186 [00:12<00:00, 15.39it/s] 9.129745
100%|██████████| 186/186 [00:11<00:00, 15.93it/s] 9.125348
100%|██████████| 186/186 [00:11<00:00, 16.08it/s] 9.122708
100%|██████████| 186/186 [00:11<00:00, 16.34it/s] 9.120946
100%|██████████| 186/186 [00:11<00:00, 16.40it/s] 9.119687
100%|██████████| 186/186 [00:11<00:00, 16.63it/s] 9.118743
100%|██████████| 186/186 [00:11<00:00, 16.45it/s] 9.118009
100%|██████████| 186/186 [00:11<00:00, 16.43it/s] 9.117418
100%|██████████| 186/186 [00:11<00:00, 16.45it/s] 9.116943
100%|██████████| 186/186 [00:11<00:00, 16.42it/s] 9.116548
100%|██████████| 186/186 [00:11<00:00, 16.55it/s] 9.116212
100%|██████████| 186/186 [00:11<00:00, 16.51it/s] 9.115925
100%|██████████| 186/186 [00:11<00:00, 16.47it/s] 9.115676
100%|██████████| 186/186 [00:11<00:00, 16.46it/s] 9.1154585
100%|██████████| 186/186 [00:11<00:00, 16.51it/s] 9.115266
100%|██████████| 186/186 [00:11<00:00, 15.96it/s] 9.115095
100%|██████████| 186/186 [00:11<00:00, 16.80it/s] 9.114943
100%|██████████| 186/186 [00:11<00:00, 16.53it/s] 9.1148
```

סעיפים 2,8 - תוצאות ה perplexity -

```
Perplexity of Reverse LSTM (2) on train data: 9030.464722187415
Perplexity of Reverse LSTM (2) on validation data: 9047.793748061038
Perplexity of Reverse LSTM (2) on test data: 9029.712529707956
```

סעיפים 6,9 -

```
### TEMP 0.1
1/1 ██████████ 0s 288ms/step
1/1 ██████████ 0s 33ms/step
1/1 ██████████ 0s 34ms/step
1/1 ██████████ 0s 44ms/step
1/1 ██████████ 0s 37ms/step
I love <UNK> Martinus <UNK> <UNK> <UNK>
1/1 ██████████ 0s 289ms/step
Probability of this sentence: 3.772950250863507e-27

### TEMP 1
1/1 ██████████ 0s 38ms/step
1/1 ██████████ 0s 35ms/step
1/1 ██████████ 0s 35ms/step
1/1 ██████████ 0s 33ms/step
1/1 ██████████ 0s 33ms/step
I love hexadecimal brother Works extreme instructions
1/1 ██████████ 0s 43ms/step
Probability of this sentence: 6.383414781956855e-56

### TEMP 10
1/1 ██████████ 0s 36ms/step
1/1 ██████████ 0s 35ms/step
1/1 ██████████ 0s 33ms/step
1/1 ██████████ 0s 33ms/step
1/1 ██████████ 0s 34ms/step
I love Tehsil concert Delta told Asteroid
1/1 ██████████ 0s 39ms/step
Probability of this sentence: 4.584347471233376e-55

Probability of "I love cupcakes": 0
```

Enter word: love

Predict Next Word

Predicted word for "love": René

1/1 ————— 0s 203ms/step

René
